

U.S.S.N. 09/909,574

Filed: July 20, 2001

AMENDMENT AND RESPONSE TO OFFICE ACTION

In the Claims

1. (currently amended) A method for producing polyhydroxyalkanoates comprising providing ~~genetically engineered~~ organisms which express enzymes selected from the group consisting of ~~diol oxidoreductase, aldehyde dehydrogenase, acyl-CoA transferase, acyl-CoA synthetase, β-ketothiolase, acetoacetyl-CoA reductase, and PHA synthase,~~ providing diols which can be converted into hydroxyalkanoate monomers by enzymes expressed by ~~in the organisms, wherein~~ the organisms are ~~transformed with genes encoding enzymes genetically engineered to express genes that encode enzymes~~ selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, wherein diol oxidoreductase and aldehyde dehydrogenase convert ~~1,4 butanediol diols~~ into hydroxyalkanoate monomers, ~~wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, having a weight-average molecular weight (Mw) of at least 300,000, and~~ culturing the organisms under conditions wherein the hydroxyalkanoate monomers are polymerized to form polyhydroxyalkanoates ~~having a weight average molecular weight (Mw) of at least 300,000.~~

2. (original) The method of claim 1 wherein the diol is 1,6-hexanediol and the hydroxyalkanoate monomer is 6-hydroxyhexanoate.

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3. (original) The method of claim 1 wherein the diol is 1,5-pentanediol and the hydroxyalkanoate monomer is 5-hydroxyvalerate.

4. (currently amended) The method of claim 1 wherein the diol is 1,4-butanediol and the hydroxyalkanoate monomer is 4-hydroxybutyrate.

5. (canceled)

6. (currently amended) The method of claim 1 wherein the diol is 1,2-ethanediol and the hydroxyalkanoate monomer is 2-hydroxyethanoate.

7. (currently amended) The method of claim 1 wherein the diol is 1,2-propanediol and the hydroxyalkanoate monomer is 2-hydroxypropionate.

8. (original) A genetically engineered organism for use in the method of claim 1 comprising an organism which expresses the *aldH* and *dhaT* genes.

9. (original) The organism of claim 8 wherein the organism is selected from the group consisting of *Escherichia coli*, *Ralstonia eutropha*, *Klebsiella* spp., *Alcaligenes latus*, *Azotobacter* spp., and *Comamonas* spp.

10. (currently amended) A system for making polyhydroxyalkanoates comprising an organism genetically engineered to that expresses genes that encode enzymes selected from the group consisting of a diol oxidoreductase, aldehyde dehydrogenase, acyl-CoA transferase, acyl-CoA synthetase, β -ketothiolase, acetoacetyl-CoA reductase, and PHA synthase,

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wherein the organism is transformed with genes encoding genetically engineered to express genes that encode enzymes selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, and

wherein the organism can convert diols into hydroxyalkanoate monomers which are polymerized to form polyhydroxyalkanoates having a weight-average molecular weight (Mw) of at least 300,000, wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate.

11-21. (canceled)

22. (new) A polyhydroxyalkanoate comprising 2-hydroxypropionate and at least one co-monomer selected from the group consisting of 4-hydroxybutyrate, 3-hydroxypropionate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxyproionate, and 3-hydroxyhexanoate, wherein the polyhydroxyalkanoate has a weight-average molecular weight (Mw) of at least 300,000.

23. (new) A polyhydroxyalkanoate comprising 2-hydroxyethanoate and at least one co-monomer selected from the group consisting of 4-hydroxybutyrate, 3-hydroxypropionate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxyproionate, and 3-hydroxyhexanoate, wherein the polyhydroxyalkanoate has a weight-average molecular weight (Mw) of at least 300,000.